Global Energy Management System

Development and Deployment within ExxonMobil Chemical Company

Presented at the
Texas Technology Showcase
Energy-Efficient Process and Best Practices
Chemical and Refining Processes

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Matthew Knight
ExxonMobil Chemical Company

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Agenda

- Background & Case for Action
- System Design
- Deployment Strategy
- Results and Conclusions
- Example Project

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Background & Case For Action
Initiative's Objectives

- Enable ExxonMobil to become a recognized industry leader in energy utilization and efficiency
- Develop *Global Energy Management System* to improve and sustain energy efficiency at ExxonMobil refineries and chemical plants worldwide
- Provide common methodology for each site

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Background & Case For Action

- Benchmarking against industry data
- Quantified significant Corporate opportunity
- Analyzed performance for refining and olefins plants at two levels:
  - ✓Company-wide competitive analysis
  - ✓Gaps of each individual ExxonMobil refinery and olefins plant relative to industry top performers

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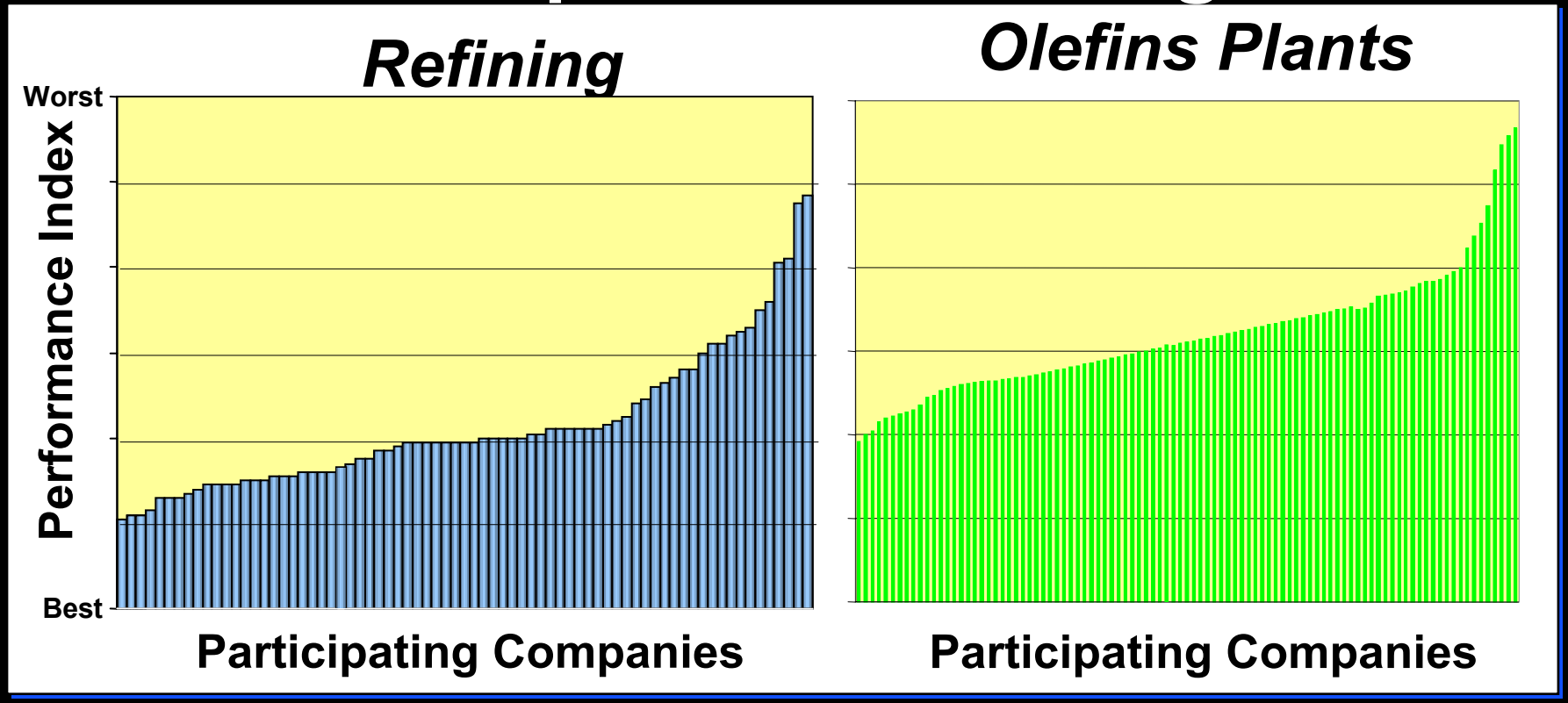
Background & Case For Action
Competitive Standing



- ExxonMobil participates in industry-wide competitive surveys
- Performance gaps versus top industry performers highlighted improvement opportunities

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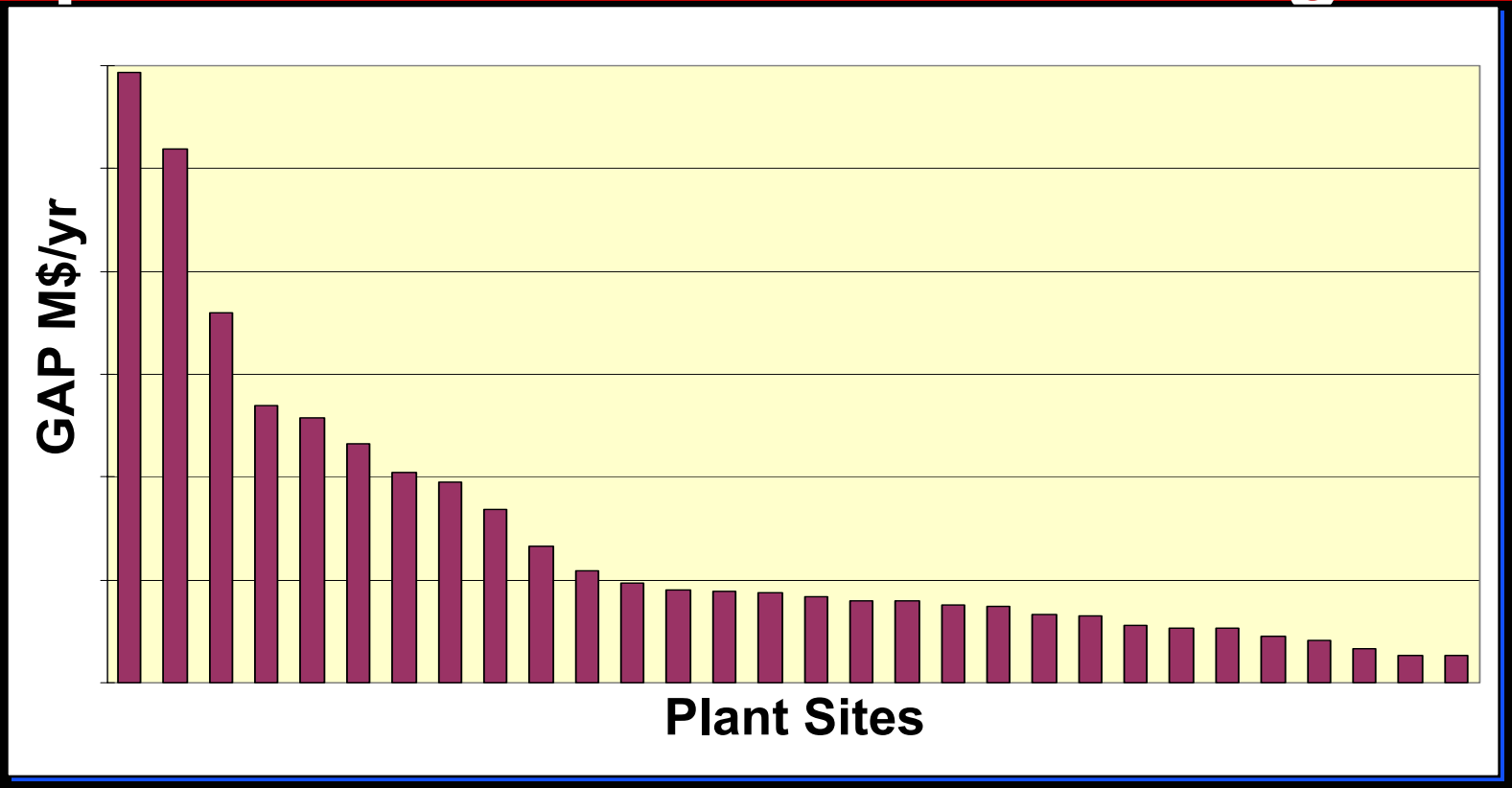
Background & Case For Action
Gap Relative to Best Performing Plants



350 - 400 M $/Year savings estimated if all ExxonMobil refineries and olefins plants could economically achieve leading-edge efficiency

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System Design

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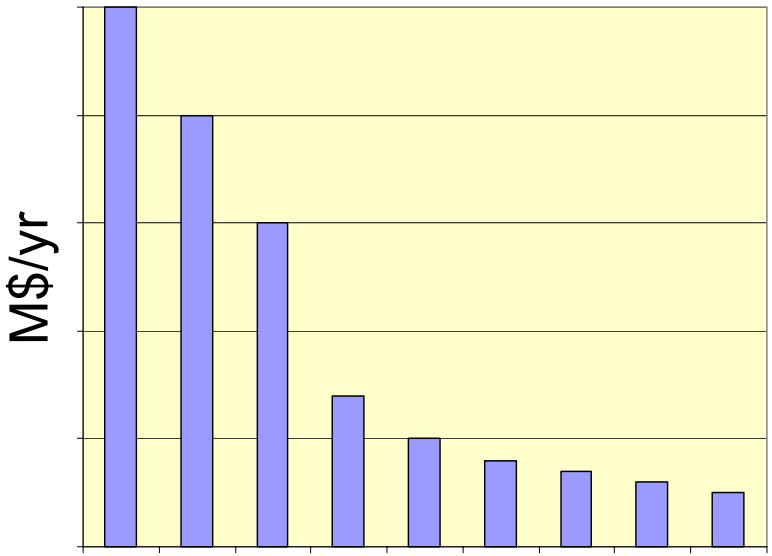
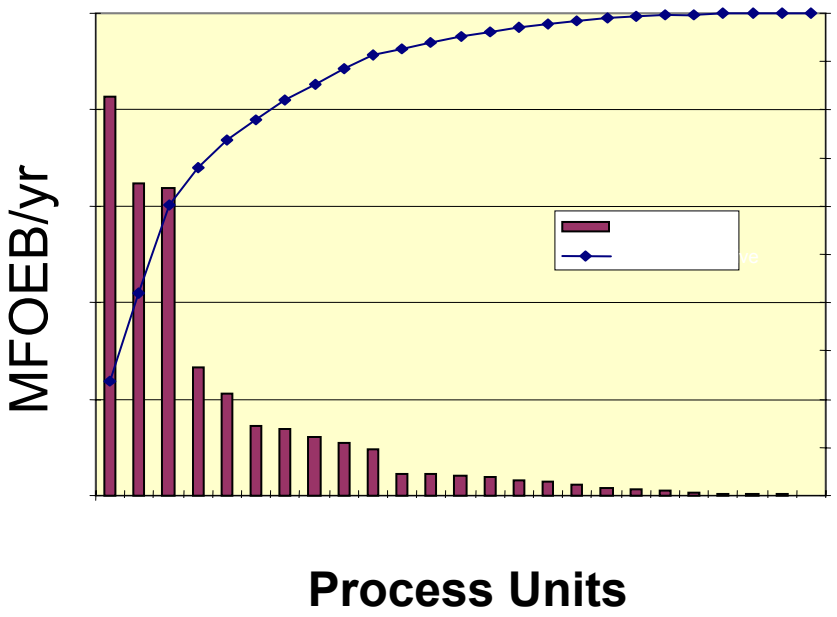
System Design Methodology





Equipment Focus: Optimization of utilities, fired heaters, heat exchangers, and compressor trains

Process Unit Focus: Olefin Crackers, Fluid Catalytic Cracking Units, and Crude Distillation

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System Design
Products

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Energy Management System

Process Units

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Equipment Classes

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Utility Systems

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Project Design

- Best practices documented in 12 volume set of manuals
- Contain 1200 pages and identify over 200 key energy variables
- Cover key process, equipment, and utility operations
- Also address energy efficiency in project design

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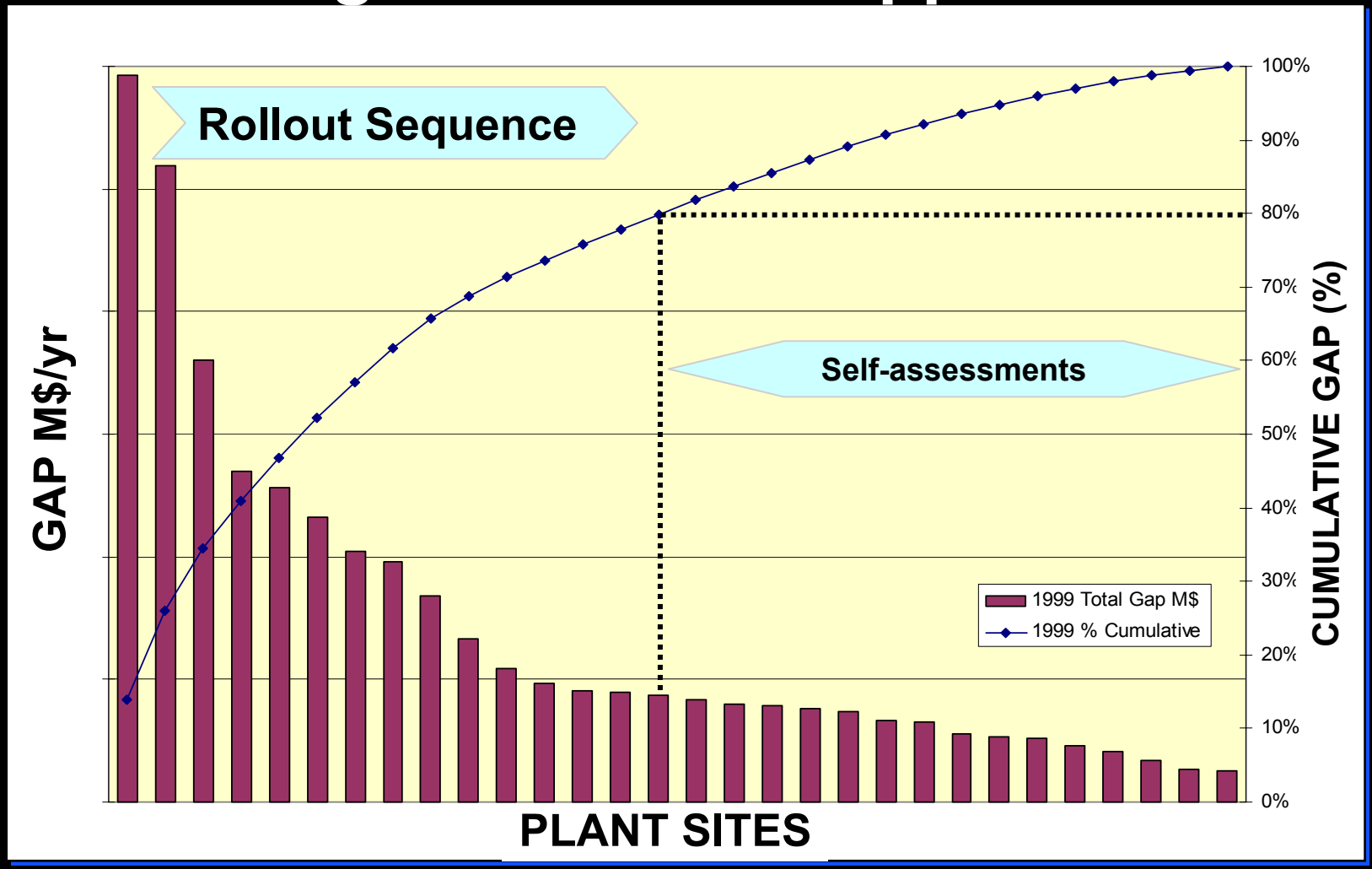
Deployment Strategy

Address Largest Potential Opportunities First



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Deployment Strategy
Rollout Process

6 Months
Preparation

6-8 Weeks
Execution

0-8 Years
Implementation

Preparation

Site Orientation
Select & Train Team
Gather & Review Data
Arrange Logistics

Operations Assessments

Process Units
Equipment Classes
Utility Systems

Facilities Enhancements

Optimizations
Modifications
Additions

Deliverables

Gap Assessment
Gap Closing Options
Cost / Benefit Analysis
Milestone Plan

Transfer of Ownership

Site
G-EMS

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Rollout Results

- Rollouts and Self-Assessments address 70-80% of total opportunity
- Potential savings equal to 15% of plant energy bill on average

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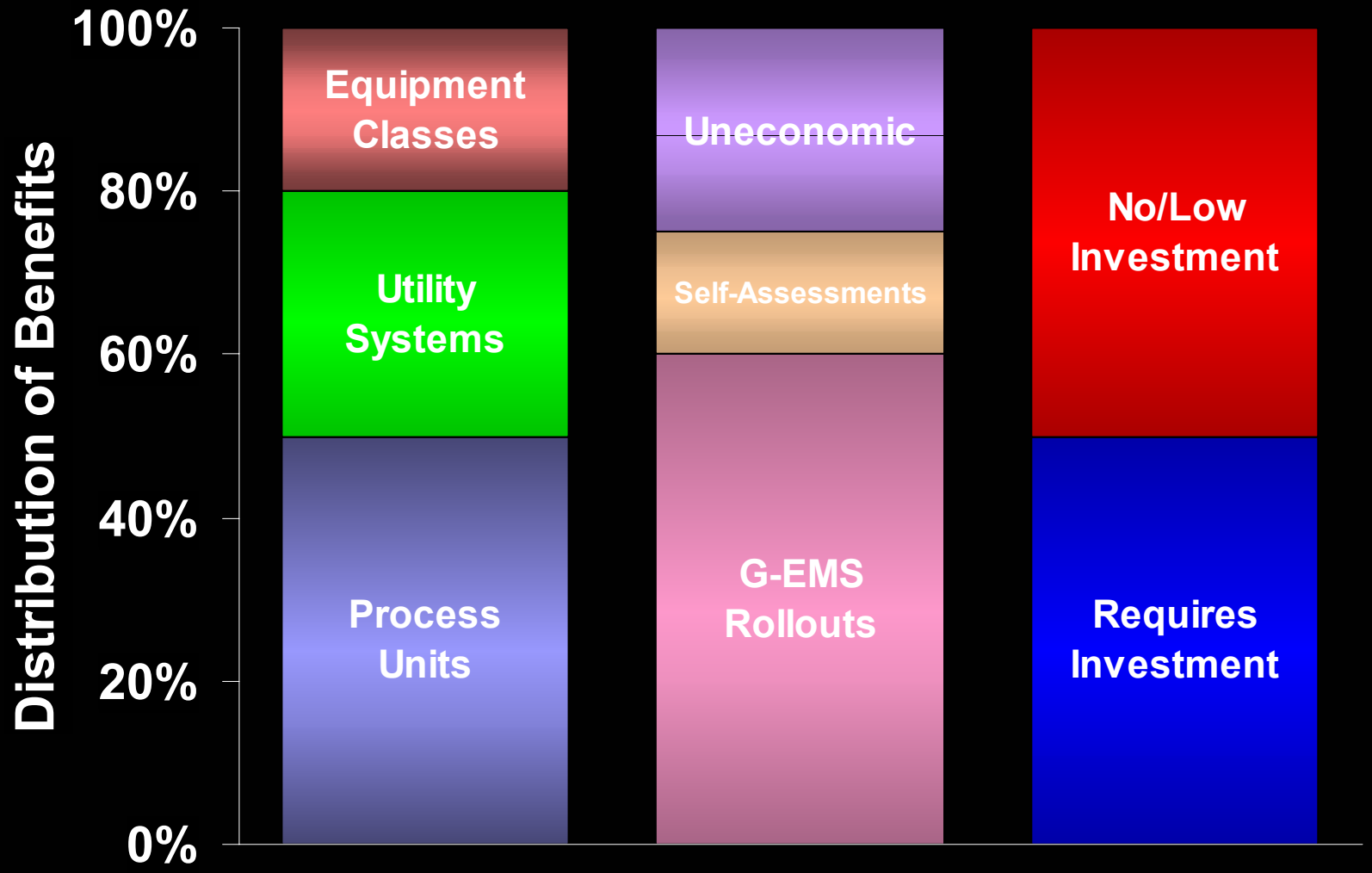
Rollout Results



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Conclusions

- A 15% reduction in site energy bills is potentially achievable through optimization of operations and economically attractive capital projects.
- Nearly half of the benefits can be achieved with little or no capital investment.
- Site Process Units is the largest opportunity for improvement
- Potential to reduce GHG emissions nearly 5 million tons per year at full implementation

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Conclusions

- Achieving and maintaining energy benefits requires a lot of hard work during preparation, deployment, implementation and sustainment phases. Key requirements are:
  - ✓ Management approval of milestone plans and integration into overall improvement plans for the site.
  - ✓ Clear ownership of each line item.
  - ✓ Strong leadership from both local and regional management.
  - ✓ High quality technical support.
  - ✓ Continuous improvement through measurement, stewardship, networking and periodic reassessments.

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Project Example

- An Olefins Plant Example of a G-EMS related Project is a Heat Integration System Modification
  - ✓ Project Identified During Initial G-EMS System Development
  - ✓ Heat Integration between Vaporizing NGL feed and Recovery Area Refrigeration System was found to be less than optimum.
  - ✓ Modifications to the system were Proposed During the Screening Phase for a Debottleneck Project.
  - ✓ Project was funded with the Debottleneck Project as an Energy Reduction Step.
  - ✓ Energy Reduction for the Refrigeration System was Calculated as ~16% even with associated through put increases.
  - ✓ System was Recently Started Up with Performance Within Design Parameters.

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